

Claims

1. Method for recognizing a structure to be applied onto a substrate, preferably an adhesive line or adhesive line, with at least two cameras, in particular three or more cameras, characterized in that

the structure to be applied is applied onto the substrate by an application facility,

and the structure applied onto the substrate by the application facility is monitored by the cameras such that

the cameras with at least one overlapping area are directed at the applied structure, whereby the applied structure, in particular the edges of the adhesive line, is determined on a surrounding track around the application facility, and whereby the surrounding track is predefined such that the applied structure intersects the surrounding track after being applied onto the substrate.

2. Method according to claim 1, characterized in that the surrounding track has a closed form around the application facility for determining the adhesive line, whereby the adhesive line on the surrounding track on the substrate is monitored by means of a projection.
3. Method according to claim 1 or 2, characterized in that the adhesive line on the surrounding track is determined in the form of an essentially circular caliper.
4. Method according to claim 1 or 2, characterized in that the adhesive line on the surrounding track is determined essentially in elliptical, polygonal form or as continuous lines.

5. Method according to any one of the preceding claims 1 to 4, characterized in that the center point or the center of the surrounding track essentially coincides with the site that corresponds to the site projected on the substrate by the application facility with regard to the adhesive line.
6. Method according to any one of the preceding claims 1 to 5, characterized in that three cameras monitor the applied structure around the application facility on the surrounding track using one overlapping area to the neighboring camera each.
7. Method according to any one of the preceding claims 1 to 6, characterized in that each camera monitors a part of the surrounding track such the individual parts of the surrounding track of the cameras join with the corresponding overlapping areas to form a continuous surrounding track that progresses on the substrate and around the application facility as monitoring area.
8. Method according to any one of the preceding claims 1 to 7, characterized in that each camera monitors a segment of the surrounding track essentially in the form of a circular line forming a circular caliper.
9. Method according to any one of the preceding claims 1 to 8, characterized in that the angle values of the circular line from 0 to 360° form a global coordinate system, whereby a segment of the circular line with adjacent overlapping areas is assigned to the images of the individual cameras.
10. Method according to any one of the preceding claims 1 to 9, characterized in that a first camera covers at least a range of angles from -10° to 130°, a second camera at least a range of angles from 110° to 250°, and a third camera at least a range of angles from 230° to 10°.
11. Method according to any one of the preceding claims 1 to 10, characterized in that a switch from one camera to the next is made automatically when the adhesive line progresses from the segment of a circular line of one camera via the overlapping area to the segment of a circular line of a different camera.

12. Method according to any one of the claims 1 to 11, characterized in that only a strip of the camera image is processed by each camera in order to form a sequence of images from the individual strips of the camera images, whereby the closed surrounding track is assembled from the strips of the individual camera images.
13. Method according to any one of the claims 1 to 12, characterized in that the individual cameras are calibrated in order to assign the angle assignment, whereby in particular a circular arc or circular line of the calibrating facility with marker points at 0° , 120° , and 240° for three cameras is used.
14. Apparatus for recognizing a structure to be applied onto a substrate, preferably an adhesive line or adhesive line, for carrying out the method according to the invention according to claims 1 to 13, whereby at least one illumination module and one sensor unit are provided, characterized in that the sensor unit is made up of at least two cameras, in particular three or more cameras, whereby the cameras are provided around and arranged on the facility for applying the structure such that each of the cameras is directed at the facility for applying the structure, whereby the cameras with at least one overlapping area are directed at the applied structure, and whereby the applied structure, in particular the edges of the adhesive line, is determined on a surrounding track around the application facility, and whereby the surrounding track is predefined such that the applied structure intersects the surrounding track after being applied onto the substrate.
15. Apparatus according to claim 14, characterized in that the axial longitudinal axis of the individual cameras essentially intersects, in the direction of view, the axial longitudinal axis of the application facility.
16. Apparatus according to claim 14 or 15, characterized in that the individual cameras, in particular three cameras, are arranged at equal distances from each other in the direction of the circumference.

17. Apparatus according to any one of the claims 14 to 16, characterized in that the individual cameras are circuited such that the images of all cameras are stored in a sequence of images.
18. Apparatus according to claim 17, characterized in that each camera records only a strip of the image to form a part of the sequence of images.
19. Apparatus according to any one of the claims 14 to 18, characterized in that the cameras form the surrounding track essentially in the form of a circular caliper.
20. Apparatus according to any one of the claims 14 to 19, characterized in that the center point or the center of the circular caliper essentially coincides with the site that corresponds to the longitudinal axis of the application facility on the substrate.
21. Apparatus according to any one of the claims 14 to 20, characterized in that each camera monitors a part of the surrounding track such the individual parts of the surrounding track of the cameras join with the corresponding overlapping areas to form a continuous surrounding track that progresses on the substrate around the application facility as monitoring area.
22. Apparatus according to any one of the preceding claims 14 to 21, characterized in that the individual cameras comprise an overlapping area of at least 10° , in particular 30° to 90° , relative to the next camera.
23. Apparatus according to any one of the claims 14 to 22, characterized in that a calibrating device with individual form elements is used for calibrating the individual cameras for the assignment of the angle assignment, whereby these form elements comprise, in particular, an angle distance of essentially 10° .
24. Apparatus according to claim 23, characterized in that the calibrating device comprises at least three marker sites that are arranged in a circular arc of the

calibrating device of essentially 0° , 120° , and 240° , in order to calibrate three cameras.

25. Apparatus according to claim 24, characterized in that the marker sites on the circular line each extend in an angle range of essentially 10° , whereby the marker sites are formed, in particular, by at least two form elements.